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Tiedekunta-Fakultet-Faculty
Faculty of Social Sciences

Laitos-Institution-Department
Department of Economics

Tekijä-Författare-Author
Zimin, Filipp

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Medical Waste, Categorisation and Handling : An Application of the Index Number Theory

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Tiivistelmä-Referat-Abstract

This thesis in the area of environmental economics examines medical waste. The goal is to assess the current practices employed by healthcare institutions regarding categorisation, handling, data collection, data analysis, and to evaluate the recent trends in waste's price and quantity movements. This goal is to be accomplished using the index number theory. I have analysed the data for two hospitals in Finland: Kuopio University Hospital for the years 2003 through 2006 and Oulu University Hospital for the period of 2004 to 2005.

I have discovered major flaws in the current categorisation and handling practices. Waste is divided into very uneven categories, with only part of the waste types being recognised. The current method of categorisation is mainly based on the classification of waste used by the waste managing companies. I propose to make it common practice to identify all the waste types and record simultaneously each waste type's quantity and service price charged for that quantity. I also propose determining all the main factors used in handling each waste type at the healthcare institution to establish the total price for that type and give examples of how to accomplish this.

The index number theory and its main concepts are introduced. I criticise the practices of healthcare institutions of adding the quantities of different wastes together to report total amount as wrong. Regardless of units of measurement various wastes constitute different values. I propose the use of index numbers instead. I argue that relative changes and index numbers should be measured in natural logarithms and results presented in log-percentages. The index numbers are shown to be ideal tools for examining medical waste. The changes in the total value of waste are decomposed into changes due to variations of prices and changes due to variations of quantities. These are calculated using five different index number formulas. I demonstrate a great degree of consistency between these index numbers and show that the calculated values are within one log-per cent for all index numbers, and within half a log-per cent for precision index numbers.

The index number formulas used in the analysis are Laspeyres, Paasche, Fisher, Edgeworth and Montgomery-Vartia indices. The chief references used in this thesis are "The Making of Index Numbers" by Irving Fisher (1927), "From Binary Index Comparisons to Index Series" by Yrjö Vartia (1995) and "Relative Changes and Index Numbers" by Yrjö Vartia (1976) as well.

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